DIABETIC RETINOPATHY UPDATE: 2008

Diabetes Telehealth Series
December 17, 2008
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DIABETES AND EYE DISEASE: LEARNING OBJECTIVES

- Identify systemic risk factors
- Differentiate clinical stages
- Describe treatment strategies & screening guidelines
- Recognize importance of team approach

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DIABETES MELLITUS: EPIDEMIOLOGY

- 135 million people with diabetes worldwide (90% type 2)
- 300 million people with diabetes projected by 2025

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DIABETES MELLITUS: EPIDEMIOLOGY

- 16 million Americans affected
- 800,000 new cases/year (type 2)
- 2x greater risk: African Americans, Latinos, Native Americans

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DIABETIC RETINOPATHY

- Retinal complications of diabetes
- Leading cause of blindness in working-age Americans

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Primary care physician
+
Ophthalmologist
↓
Systemic control, timely screening, early Rx

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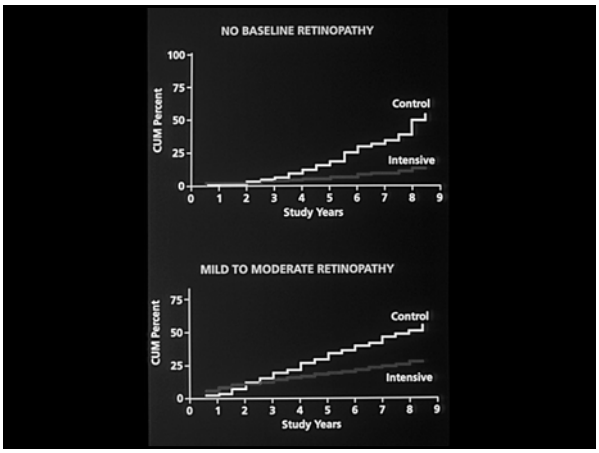

INTENSIVE GLUCOSE CONTROL: NO BASELINE RETINOPATHY

- 76% reduction in risk of developing progressive retinopathy

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INTENSIVE GLUCOSE CONTROL: MILD TO MODERATE RETINOPATHY

- 54% reduction in progression of retinopathy
- 47% reduction in development of severe NPDR or PDR
- 59% reduction in need for laser surgery

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UKPDS: TYPE 2 DIABETES

- Increased glucose & BP control decreases progression of retinopathy

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UKPDS: RESULTS

- Hemoglobin A_{1c} reduced from 7.9 to 7.0 = 25% decrease in microvascular complications
- BP reduced to <150/85 mm Hg = 34% decrease in retinopathy progression

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HYPERTENSION CONTROL

- As important as glucose control in lowering risk of diabetic retinopathy
- ACE inhibitor or beta blocker decreases microvascular complications

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DCCT/UKPDS LESSONS

- Professional & patient education
- Good glucose & BP control
- Regular examination

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ADDITIONAL SYSTEMIC CONTROLS

- Decreasing proteinuria with ACE inhibitors may improve macular edema

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Lowering cholesterol may lead to decreased hard exudates & improved vision.

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DIABETIC RETINOPATHY & CARDIOVASCULAR DISEASE

- PDR a risk indicator for MI, stroke, amputation
- PDR elevates risk of developing nephropathy

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DIABETIC RETINOPATHY: PATHOGENESIS

Increased glucose

↓

VEGF

↓

Capillary permeability/ vasoproliferation

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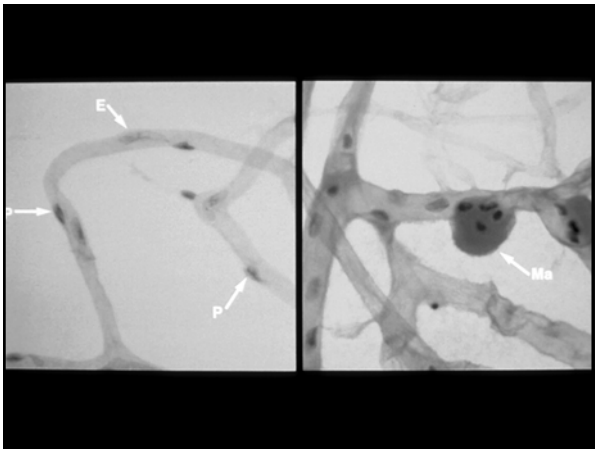

DIABETIC RETINOPATHY: CLINICAL STAGES

- Nonproliferative diabetic retinopathy (NPDR)
- Preproliferative diabetic retinopathy
- Proliferative diabetic retinopathy (PDR)

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NPDR: EARLY CLINICAL SIGNS

- Microaneurysms
- Hard exudates
- Intraretinal hemorrhages

Patients may be asymptomatic.

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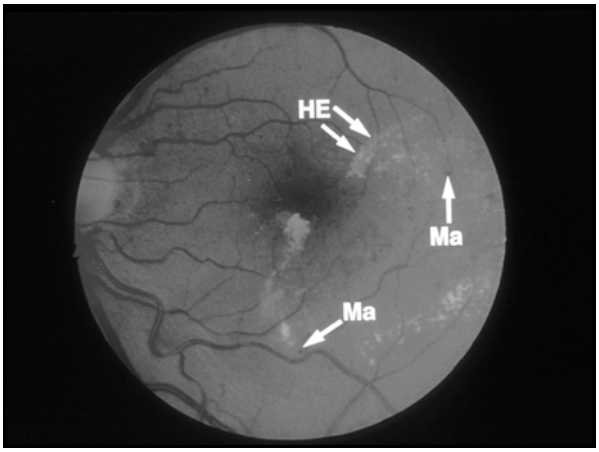

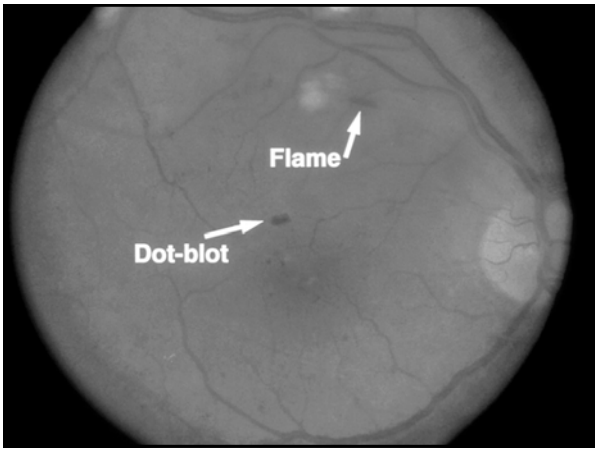

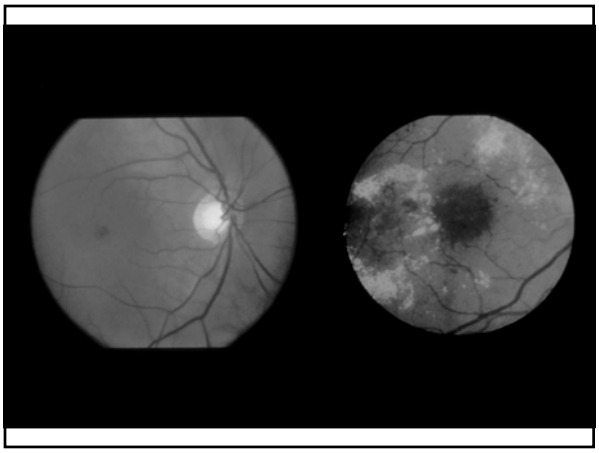

DIABETIC MACULAR EDEMA

- Diabetes ≤5 yrs = 5% prevalence
- Diabetes ≥15 yrs = 15% prevalence

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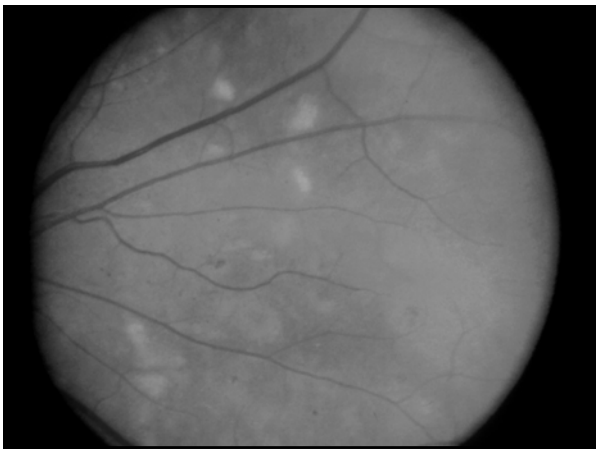

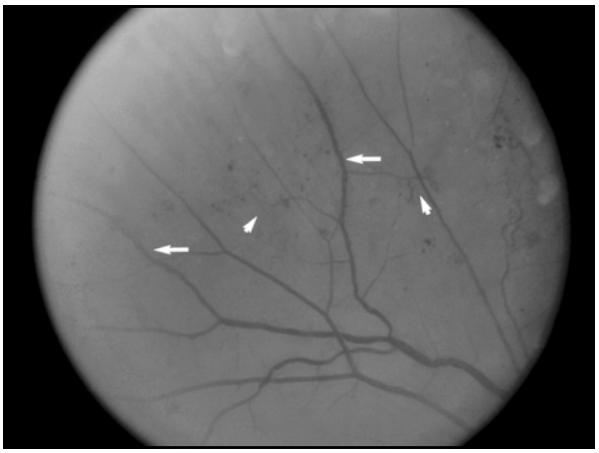

PDR: CLINICAL SIGNS

- Neovascularization
- Vitreous hemorrhage & traction
- NPDR features, including macular edema

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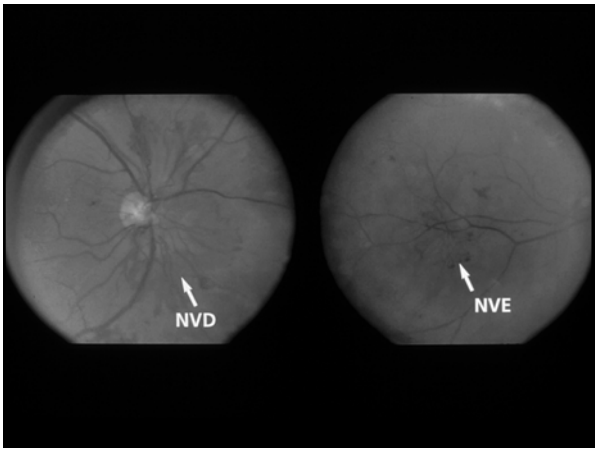

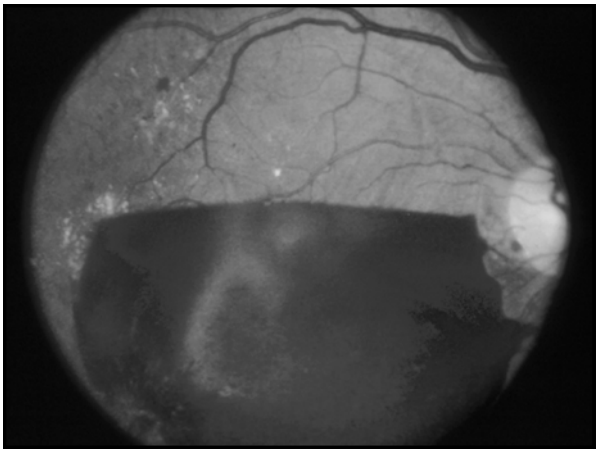

VITREOUS HEMORRHAGE: SYMPTOMS

- Floaters
- Severe visual loss

Requires immediate ophthalmologic consultation

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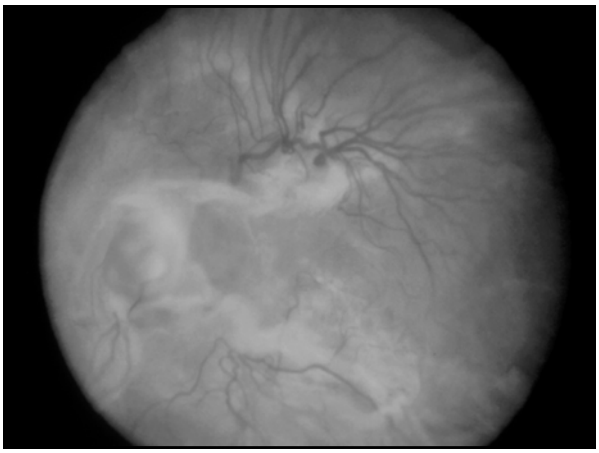

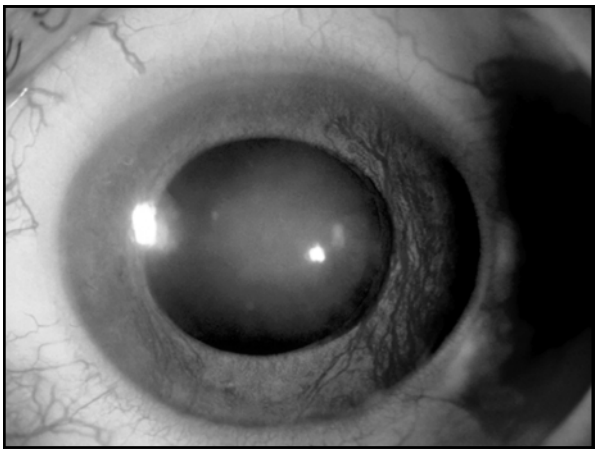

INSULIN USERS Dx <AGE 30

Duration (yrs)	PDR Prevalence
5	negligible
15	25%
20	55%

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INSULIN USERS Dx >AGE 30

Duration (yrs)	PDR Prevalence
20 yrs	20%

PDR less common among non-insulin users

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REVIEW OF CLINICAL STAGES

- Nonproliferative diabetic retinopathy
  - Patients may be asymptomatic
- Preproliferative retinopathy
  - Laser therapy at this stage may help prevent long-term visual loss
- Proliferative retinopathy
  - Major cause of severe visual loss

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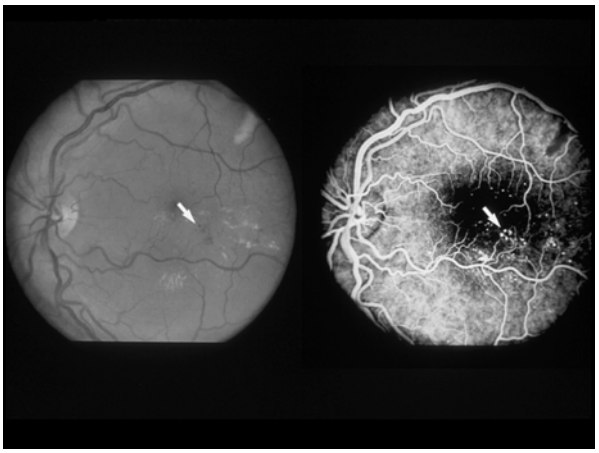
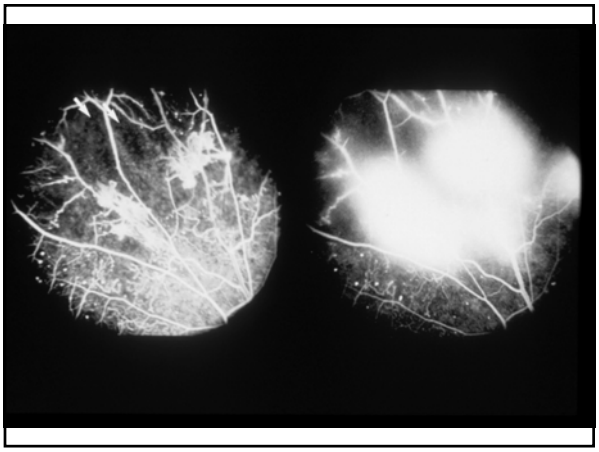
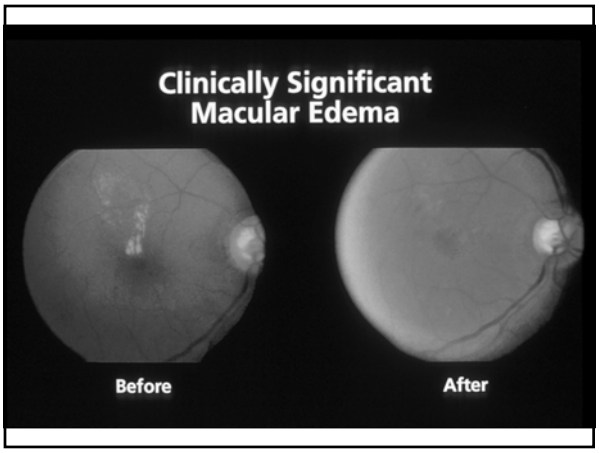
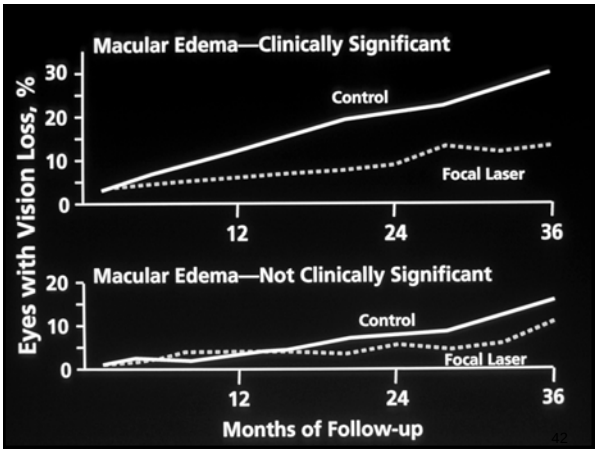





Clinically Significant
Macular Edema
Before
After


Macular Edema—Clinically Significant
Eyes with Vision Loss, %
30
20
10
0
Control
Focal Laser
12
24
36
Macular Edema—Not Clinically Significant
20
10
0
Control
Focal Laser
12
24
36
Months of Follow-up

PANRETINAL PHOTOCOAGULATION (PRP)

- Outpatient procedure
- Approx. 1000 to 2000 burns
- 1 to 3 sessions

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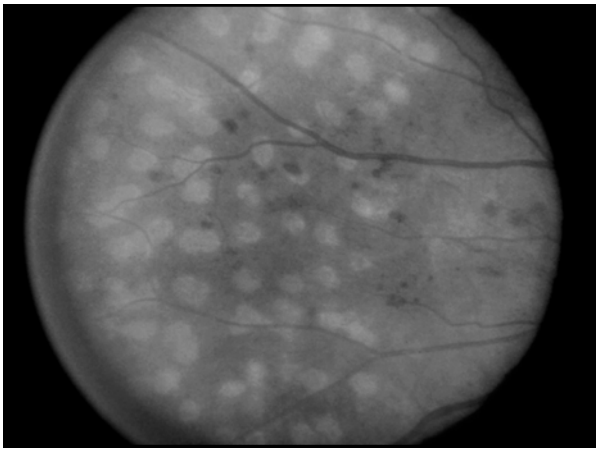

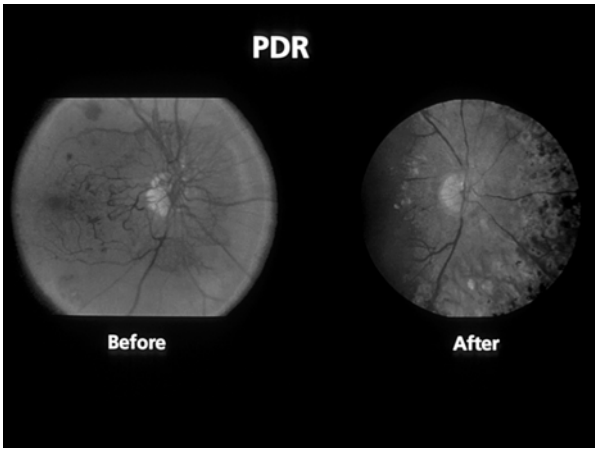

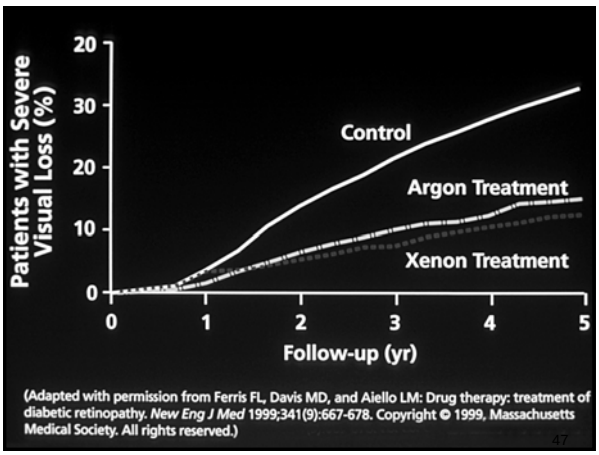

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PRP: SIDE EFFECTS

- Decreased night vision
- Decreased peripheral vision

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VITRECTOMY

- Remove vitreous hemorrhage
- Repair retinal detachment
- Allow treatment with PRP

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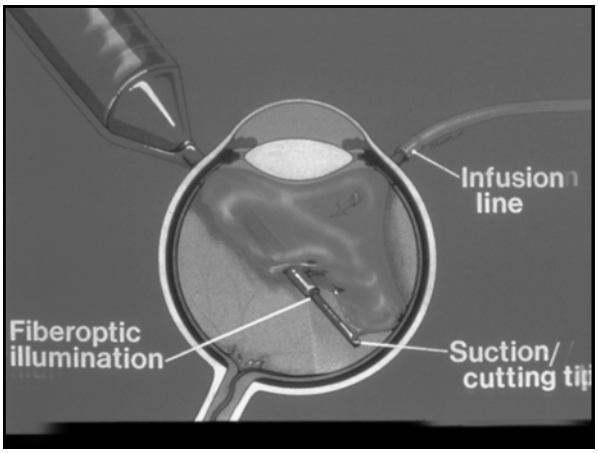

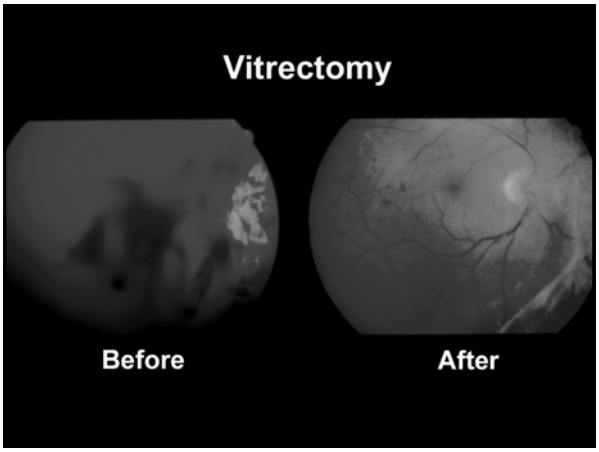

TREATMENT OPTIONS: REVIEW

- Laser photocoagulation surgery
  - Focal macular laser for CSME
  - Panretinal photocoagulation for PDR
- Vitrectomy
  - May be necessary for vitreous hemorrhage or retinal detachment

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Emerging Treatments in Diabetic Retinopathy

- Intravitreal steroids
- Anti-VEGF agents
- New drug delivery systems

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SCREENING GUIDELINES: PATIENTS WITH TYPE 1 DIABETES

- Annual ophthalmologic exams starting 5 years after diagnosis & not before puberty

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PATIENTS WITH TYPE 2 DIABETES

- Annual ophthalmologic exams starting at time of Dx

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DIABETES & PREGNANCY

- Ophthalmologic exam before conception
- Ophthalmologic exam during first trimester
- Follow-up depends on baseline grade

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ACCESS & COMPLIANCE

- 36% missed annual ocular exam
- 60% missed laser surgery

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GOALS FOR SUCCESS

- Better systemic control of:
  - Hemoglobin A_{1c}
  - BP
  - Kidney status
  - Serum lipids

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GOALS FOR SUCCESS

- Timely screening reduces risk of blindness from 50% to 5%
- 100% screening estimated to save $167 million annually

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NEED FOR IMPROVED SCREENING

- Treatment for DR may be 90% effective in preventing severe vision loss (VA <5/200)
- However, the number of patients with diabetes referred by primary care providers for ophthalmic care is far below the guidelines of the ADA and AAO
- 25,000 cases of diabetes-related blindness occur in US each year

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U.S. DIABETES CENTER

- **18 million Americans affected**
- **New case diagnosed every 40 seconds**
- **Average life expectancy 15 years less than non-diabetic population**
- **Diabetes kills 1 American every 3 minutes**
- **75% will die of heart disease or stroke**

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PREVALENCE OF DIABETIC RETINOPATHY AMOUNG ADULTS

- **Approximately 4.1 million US adults 40 years and older have diabetic retinopathy**
- **Among adults with DM, estimated 40% have retinopathy and 8% have vision-threatening retinopathy**

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RISK FACTORS FOR DIABETIC RETINPATHY

- **Duration of diabetes**
- **Severity of hyperglycemia**
- **Hypertension**
- **Retinopathy can accelerate during puberty and pregnancy**

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